

REMARKS

By this amendment, applicants have amended the claims to more clearly define their invention. In particular, the claims have been amended to eliminate the indefiniteness problems noted by the Examiner in numbered section 2 of the office action, to eliminate reference numerals from the claims and to clarify, in claim 5, that the additional shaped elements are provided on a peripheral surface of the core material for securing the core material against torsion in the work piece. See, Figure 2a and the sentence bridging pages 6 and 7 of applicants' specification.

In view of the foregoing amendments to the claims, it is submitted all of the claims now in the application comply with the requirements of 35 USC 112, second paragraph. Accordingly, reconsideration and withdrawal of the rejection of claims 1 - 15 under 35 USC 112, second paragraph, are requested.

Claims 1 - 3 and 14 stand rejected under 35 USC 102(b) as allegedly being anticipated by United States Patent No. 5,860,401 to Adachi et al. Applicants traverse this rejection and request reconsideration thereof.

The present invention relates to a method for increasing the wear resistance of a work piece. According to the present invention, the work piece is connected to a core material that cannot be reshaped and which is of greater hardness than the work piece material. The core material is connected to the work piece in a form-fitting manner by means of cold-extrusion or hot-extrusion of the work piece material.

The patent to Adachi et al discloses a valve seat 46 formed from an

insert ring, indicated generally by the reference numeral 67 which is bonded in place into the basic cylinder head material 42. A metallurgical bond is formed at the interface between the insert ring 67 and the base cylinder head material 42. See, e.g., column 6, lines 49 - 54 of Adachi et al. As can be seen in Figure 16 and the accompanying description, a solidus diffusion layer is formed by the bonding method. Thus, while the Adachi et al patent describes a metallurgical bond (i.e., a pure substance fitting), the work piece is connected to the core material according to the present invention in a form-fitting manner by means of cold-extrusion or hot-extrusion of the work piece. The Adachi et al patent does not disclose connecting a work piece to a core material in a form-fitting manner by means of cold-extrusion or hot-extrusion of the work piece as presently claimed.

Claims 4 - 13 and 15 stand rejected under 35 USC 103(a) as allegedly being unpatentable over Adachi et al. Applicants traverse this rejection and request reconsideration thereof.

Claims 4 - 13 and 15 are patentable over Adachi et al for the reasons noted above. Moreover, the Adachi et al patent does not disclose and would not have suggested the various features recited in the dependent claims. The Examiner dismisses these features as design limitations "held to be obvious and not given patentable weight in these method of manufacturing claims as such limitation(s) do not result in any difference in the *claimed* manufacturing process." In the first place, the various features recited in the dependent claims do result in a difference in the claimed manufacturing process from that described in Adachi et al. Certainly, the type and shape of core material

and the apparatus used to carry out the method have a direct relationship to the claimed manufacturing process. A process (such as that described in Adachi et al) which does not use the claimed core material or the claimed processing apparatus is, quite simply, a different process.

Moreover, dismissing the features of the dependent claims as "design limitations" and holding the same to be obvious without any evidence that they would have been obvious does not fulfill the obligation of the Patent and Trademark Office to provide reasoned decision-making in connection with the obvious issue under 35 USC 103. See In re Lee, 277 F.3d 1338, 61 USPQ 2d, 430 (Fed. Cir. 2002).

For example, noting the features of claims 5 - 7 and 15, the shape of the core material is important to secure the core material against torsion in the work piece when cold extrusion or hot-extrusion is used to connect the work piece to the core material. The claimed shapes for the core material would not be necessary when using a metallurgical bond as described in Adachi et al. Accordingly, it would not have been obvious to provide the core material in the claimed shape based on the teachings of Adachi et al.

For the foregoing reasons, it is submitted claims 4 - 13 and 15 are patentable over Adachi et al.

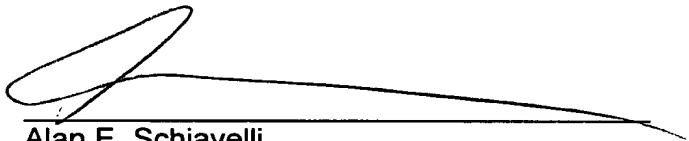
In view of the foregoing amendments and remarks, favorable reconsideration and allowance of all of the claims now in the application are requested.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in

connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 306.38372X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

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1. (Amended) Method ~~A method for increasing the wear-resistance of a work piece, comprising connecting the work piece (1) being connected to a core material (2) that cannot be reshaped and which is of a greater hardness than the work-piece material, characterised in that the core material (2) is connected to the work piece (1) in a form-fitting manner by means of cold-extrusion or hot-extrusion of the work-piece material.~~
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3. (Amended) Method according to claim 1, characterised in that the core material (2) is a hard metal or a hardened metal.

4. (Amended) Method according to claim 1, characterised in that the core material (2) is a ceramic sintered material.

5. (Amended) Method according to claim 1, characterised in that the core material (2) has additional shaped elements provided on a peripheral surface of the core material for securing the core material against torsion in the work piece.

6. (Amended) Method according to claim 5, characterised in that the additional shaped elements are constituted by a knurling (3) that is provided on the outside an outer peripheral surface of the core material.

7. (Amended) Method according to claim 1, characterised in that the core material (2) tapers towards the an outside of the work piece.

8. (Amended) Method according to claim 1, characterised in that a bore (5) in which a displaceable punch (6) connects the work piece (1) to the core material (2) is arranged in an extrusion sleeve liner-(4).

9. (Amended) Method according to claim 8, characterised in that a

displaceable ejector (7) is provided as an abutment for the work piece (1) or the core material (2) in the bore.

10. (Amended) Method according to claim 8, characterised in that a constriction (8) is provided in the bore (5) as an abutment for the work piece (1) or the core material (2).

11. (Amended) Method according to claim 8, characterised in that the punch (6) is a hollow punch.

12. (Amended) Method according to claim 8, characterised in that the punch (6), at its end that faces the work piece (1) or core material (2), has a clearance (9) from the bore (5) in the sleeve liner (4).

13. (Amended) Method according to claim 8, characterised in that a further displaceable punch, to which force can be applied, is arranged in the punch (6).

14. (Amended) Method according to claim 1, characterised in that ~~this method is used or the work piece is a work pieces piece of a valve systems, in particular valve drives of system for internal combustion engines.~~